

LETTERS TO THE EDITOR.

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Change of Feeding Habits of Rhinoceros-birds in British East Africa.

THE enclosed extract from a letter just received by me from my friend, Captain Hinde, of the British East Africa Protectorate, will interest all zoologists. It is a curious fact that a bird which is so valuable as *Buphaga* in clearing parasitic insects from cattle that we lately agreed to give it special protection at the International Conference on the Preservation of African Wild Animals, should now, by a sudden change of conditions induced by man, become a dangerous and noxious creature. This fact shows how difficult is the problem presented by the relations of civilised man to a fauna and flora new to his influence.

E. RAY LANKESTER.

Natural History Museum, London, August 10.

"The following case of wild birds changing their habits may interest you:—The common rhinoceros-bird (*Buphaga erythro-gyna*) here formerly fed on ticks and other parasites which infest game and domestic animals; occasionally, if an animal had a sore, the birds would probe the sore to such an extent that it sometimes killed the animal. Since the cattle plague destroyed the immense herds in Ukambani, and nearly all the sheep and goats were eaten during the late famine, the birds, deprived of their food, have become carnivorous, and now any domestic animal not constantly watched is killed by them. Perfectly healthy animals have their ears eaten down to the bone, holes torn in their backs and in the femoral regions. Native boys amuse themselves sometimes by shooting the birds on the cattle with arrows, the points of which are passed through a piece of wood or ivory for about half an inch, so if the animal is struck instead of the bird no harm is done. The few thus killed do not seem in any way to affect the numbers of these pests. On my own animals, when a hole has been dug, I put in iodoform powder, and that particular wound is generally avoided by the birds afterwards; but if the birds attack it again, they become almost immediately comatose and can be destroyed. This remedy is expensive and not very effective. Is there any other drug you could suggest that would be less likely to be detected? Perhaps you know that I reported three years ago that these birds rendered isolation under the cattle plague regulations useless in some districts, as I proved beyond doubt they were the only means of communication between clean and infected herds under supervision, a mile or two apart. These birds I have never seen on the great herds of game on the open plains, but I have seen them on antelope and rhinoceros in the immediate neighbourhood of Masai villages, and herds of cattle; on the other hand, I have never seen the small egret on cattle, though often on rhinoceros and gnū."

Atmospheric Electricity.

IN NATURE of June 14 Mr. Wilson replies to the objections raised in my letter of March 29 to his explanation of the origin of atmospheric electricity. Before proceeding to consider Mr. Wilson's reply to my objections it may be well that the point at issue between us should be clearly defined. As Mr. Wilson, in my opinion, somewhat confuses it. Mr. Wilson says, "Mr. Aitken contends there is no such thing as dust-free air in the atmosphere." Now I certainly made no such statement, for the simple reason that I do not know whether such a condition exists to any extent or not, only a few cases being on record. What I did state was, "So far as our knowledge goes, it can hardly be said there is such a thing as dust-free air in our atmosphere, and the cases in which low numbers have been observed are so extremely rare that they can hardly have any bearing on phenomena of such widespread existence as atmospheric electricity, even though we suppose those few particles to be afterwards got rid of." I simply asked for a verdict of "not proven" against Mr. Wilson's theory. I think it will be admitted that it rests with Mr. Wilson, and those who think with him, to prove that the air is generally dust-free at elevations higher than ordinary cumulus and nimbus clouds, as

without this dustless air the supersaturation necessary for condensation on ions is admittedly not possible.

Mr. Wilson discusses the question of the number of dust particles in the atmosphere from Mr. Rankin's Ben Nevis observations and my own at Kingairloch, and points out that practically dust-free air has been observed on Ben Nevis. Such is the case, but so far as I know dust-free air has been observed on only a few occasions, and such isolated instances have evidently no bearing on the case. Mr. Wilson then turns to my observations and says "the mean number of dust particles in a series of 258 observations, extending over nearly five years, amounting to 338 per c.c.; on one occasion the number was as low as 16 per c.c." The above statement, it must be clearly understood, refers to 258 of the tests made in the purest air, and is not the mean of all the observations. In the tables there are 688 observations for Kingairloch: of these I find there are 41 in which the reading was under 100, 341 were over a 100 but less than 1000 per c.c., whilst the remaining 306 observations were all over 1000 per c.c. The 16 per c.c. referred to by Mr. Wilson only occurred once. In the other years referred to the lowest figures were 38, 43, 67 and 205 per c.c. So that, as already said, the conditions represented by those low figures, such as 0 on Ben Nevis and 16 at Kingairloch, are so exceptional that they are not likely to play any part in phenomena so universal as atmospheric electricity.

Mr. Wilson, referring to the selected observations taken at Kingairloch on the pure air coming from the Atlantic, says: "Air coming from such a region can hardly be considered as abnormal. Moreover, such observations are necessarily made in air within a few feet of the ground; at a greater height it is likely to be less contaminated." Taking the last of these points first, an examination of the diagrams given along with the tables, from which Mr. Wilson made his extracts, will show that whenever the air became pure the readings low down and high up were nearly alike. This is shown by the curves in the diagrams for Ben Nevis and Kingairloch being nearly alike during these periods. Further, it may be seen from the curves that there was sometimes less dust at low than at high level when the air came from the Atlantic.

An examination of the tables from which Mr. Wilson took his Kingairloch figures easily refutes his assumption that the air of the Atlantic, as given in these tables, "can hardly be considered as abnormal." In the tables will be found the results of tests made in France, Italy and Switzerland. Observations were made at three places in France on the shores of the Mediterranean, at Hyères, Cannes and Mentone. An analysis of the figures for these places, made during visits extending over five years, shows that the lowest number observed was 725 per c.c., and of eighty-eight tests only ten were under 1000 per c.c., the others being all over 1000. At the Italian Lakes observations were made at Bellagio and Baveno. Many of these observations were made at elevations up to 2000 feet. In all, 188 tests were made: of these the lowest was 300 per c.c. On only thirteen occasions was the number under 1000, and 175 readings gave numbers over 1000 per c.c.

Perhaps it may be objected that all these Continental tests were made in low level polluted air. We shall therefore now examine the result of the observations made on the Rigi Kulm, given in the same tables. The top of the Rigi is 5900 feet above sea-level, but it has only the purifying effect of 4400 feet, as it is only about that height above the surrounding plains. During the tests, made on the visits during the five different years previously referred to, 259 observations were taken on thirty-two days, and the lowest number observed was 210 per c.c. Ninety-seven observations gave readings under 1000 per c.c., whilst the other 162 tests were all over 1000 per c.c. These tests, at both high and low level, give no support to Mr. Wilson's statement that the Atlantic air on the west coast of Scotland "can hardly be considered as abnormal."

Let me further support this point by reference to observations made by others of the air in different parts of the world. Prof. G. Melander, of Helsingfors, in his work, entitled "Sur la condensation de la vapeur d'eau dans l'atmosphère," gives the results of 268 tests made of the air at Salève, Biskra, Torhola, Loimola, Kristiansund and Grip. In all these 268 samples of air tested there were only five with less than 500 per c.c., and no low numbers were observed.

I now turn to the very interesting series of observations made by Mr. E. D. Fridlander and published in the *Quarterly Journal* of the Royal Meteorological Society, vol. xxii. No. 99,